

Claims

- [c1] 1. A structure, comprising:
charge pump receiving a first charge pump input signal and a second charge pump input signal, the charge pump including a sourcing current path which includes a sourcing current control gate; and
a charge pump current controller receiving as inputs the first and second charge pump input signals,
wherein the charge pump current controller is configured to generate a sourcing current control signal to the sourcing current control gate in response to the first and second charge pump input signals being at opposite levels, and wherein the sourcing current control gate is configured to change its current in response to the sourcing current control signal being generated.
- [c2] 2. The structure of claim 1, wherein the longer the first and second charge pump input signals are at opposite levels, the higher the current flowing through the sourcing current control gate becomes.
- [c3] 3. The structure of claim 1, wherein the sourcing current control gate is a transistor having a gate terminal receiving the sourcing current control signal.

- [c4] 4. The structure of claim 1, wherein the charge pump further comprises a sinking current path which includes a sinking current control gate, wherein the charge pump current controller is further configured to generate a sinking current control signal to the sinking current control gate in response to the first and second charge pump input signals being at opposite levels, and wherein the sinking current control gate is configured to change its current in response to the sinking current control signal being generated.
- [c5] 5. The structure of claim 4, wherein the longer the first and second charge pump input signals are at opposite levels, the higher the current flowing through the sinking current control gate becomes.
- [c6] 6. The structure of claim 4, wherein the sinking current control gate is a transistor having a gate terminal receiving the sinking current control signal.
- [c7] 7. The structure of claim 1, wherein the charge pump current controller comprises:
a capacitor;
a capacitor charging circuit being electrically coupled to the capacitor and receiving as inputs the first and second charge pump input signals; and

a control signal generator electrically coupled to the capacitor,
wherein the capacitor charging circuit is configured to charge up the capacitor in response to the first and second charge pump input signals being at opposite levels, and wherein the control signal generator is configured to generate the sourcing current control signal in response to the capacitor being charged up.

[c8] 8. The structure of claim 7, wherein the control signal generator comprises a comparator including a first comparator input node, a second comparator input node, and a comparator output node, the first comparator input node being electrically coupled to the capacitor, the second comparator input node receiving a reference voltage level,
wherein the comparator is configured to generate the sourcing current control signal to the sourcing current control gate via the comparator output node in response to the capacitor being charged up.

[c9] 9. A method of operating a structure, the method comprising the steps of:
providing in the structure a charge pump receiving a first charge pump input signal and a second charge pump input signal, the charge pump including a sourcing current path which includes a sourcing current control gate;

providing in the structure a charge pump current controller receiving as inputs the first and second charge pump input signals;
generating, with the charge pump current controller, a sourcing current control signal to the sourcing current control gate in response to the first and second charge pump input signals being at opposite levels; and
adjusting the current flowing through the sourcing current control gate in response to the sourcing current control signal being generated.

[c10] 10. The method of claim 9, wherein the longer the first and second charge pump input signals are at opposite levels, the higher the current flowing through the sourcing current control gate is adjusted.

[c11] 11. The method of claim 9, wherein the sourcing current control gate is a transistor having a gate terminal receiving the sourcing current control signal.

[c12] 12. The method of claim 9, further comprising the steps of:
providing in the charge pump a sinking current path which includes a sinking current control gate;
generating, with the charge pump current controller, a sinking current control signal to the sinking current control gate in response to the first and second charge

pump input signals being at opposite levels; and adjusting the current flowing through the sinking current control gate in response to the sinking current control signal being generated.

[c13] 13. The method of claim 12, wherein the longer the first and second charge pump input signals are at opposite levels, the higher the current flowing through the sinking current control gate is adjusted.

[c14] 14. The method of claim 12, wherein sinking current control gate is a transistor having a gate terminal receiving the sinking current control signal.

[c15] 15. The method of claim 9, further comprising the steps of:
providing in the charge pump current controller (i) a capacitor, (ii) a capacitor charging circuit being electrically coupled to the capacitor and receiving as inputs the first and second charge pump input signals, and (iii) a control signal generator electrically coupled to the capacitor;
charging up the capacitor, with the capacitor charging circuit, in response to the first and second charge pump input signals being at opposite levels; and
generating, with the control signal generator, the sourcing current control signal in response to the capacitor being charged up.

- [c16] 16. The method of claim 15, further comprising the steps of:
providing in the control signal generator a comparator including a first comparator input node, a second comparator input node, and a comparator output node, the first comparator input node being electrically coupled to the capacitor, the second comparator input node receiving a reference voltage level; and
generating, with the comparator, the sourcing current control signal to the sourcing current control gate via the comparator output node in response to the capacitor being charged up.
- [c17] 17. A method of operating a charge pump receiving as inputs a first charge pump input signal and a second charge pump input signal, the method comprising the steps of:
providing a sourcing current control gate on a sourcing current path of the charge pump; and
adjusting the current flowing through the sourcing current control gate in response to the first and second charge pump input signals being at opposite levels.
- [c18] 18. The method of claim 17, wherein the step of adjusting the current flowing through the sourcing current control gate in response to the first and second charge

pump input signals being at opposite levels comprises the steps of:

charging up a capacitor in response to the first and second charge pump input signals being at opposite levels; generating a capacitor signal in response to the capacitor being charged up; generating, with a comparator, a sourcing current control signal to the sourcing current control gate in response to the capacitor signal being generated; and adjusting the current flowing through the sourcing current control gate in response to the sourcing current control signal being generated.

- [c19] 19. The method of claim 17, further comprising the steps of:
- providing a sinking current control gate on a sinking current path of the charge pump; and
- adjusting the current flowing through the sinking current control gate in response to the first and second charge pump input signals being at opposite levels.

- [c20] 20. The method of claim 19, wherein the step of adjusting the current flowing through the sinking current control gate in response to the first and second charge pump input signals being at opposite levels comprises the steps of:
- charging up a capacitor in response to the first and sec-

ond charge pump input signals being at opposite levels;
generating a capacitor signal in response to the capacitor being charged up;
generating, with a comparator, a sinking current control signal to the sinking current control gate in response to the capacitor signal being generated; and
adjusting the current flowing through the sinking current control gate in response to the sinking current control signal being generated.